by US scientists, much of it in protest against the policies of US President Donald Trump.

Aaron Huertas, the former communications director for March for Science and an author of the letter, says that the organization is becoming hierarchical, rather than the grass-roots movement that many volunteers wanted.

He and his letter co-signatories are concerned that the group has not published a detailed accounting of its finances, including the US$1.3 million it raised between 1 February and 30 April. They are uncomfortable with the group's decision to ask some volunteers and board members to sign non-disclosure or confidentiality agreements, and to hire one of the original co-chairs, Caroline Weinberg, as its interim director without advertising the job.

Weinberg says that the board hired her in August as the part-time interim executive director, that a public search for a permanent director will begin in December, and that the March for Science will release more-detailed financial information soon. In the meantime, the disclosure on 24 October that Weinberg and her two co-chairs received money for their services is also coming under scrutiny.

Terry Kush, the March for Science's chief operating officer, revealed the payments in a memo to the organization's satellite groups. "In May and June, 12 national team members were paid for their work those months, including the former co-chairs," Kush wrote. She added: "We'd like to reaffirm our commitment to increasing transparency within the org and the larger grass-roots movement."

The group's three original co-chairs — Weinberg, Jonathan Berman and Valorie Aquino — resigned from their positions in late April and signed a confidential agreement with the organization in late August, Weinberg says. She adds that although she "cannot comment on the clauses therein", that does not prevent her from being open about "the march, our work, accounting, governance, or legal structures". Aquino and Weinberg also signed what Weinberg calls "standard" confidentiality agreements with the board.

Huertas calls the payments "secret", and argues that not disclosing them publicly undermined the effectiveness of the March for Science group. Weinberg says that the payments were made in July, but not publicly released until now because they took place mid-fiscal year.

"The accusation that we are in this to enrich ourselves and make money is deeply offensive," Weinberg says. "Most people do not have the luxury of volunteering full time." ■

ROBERT NICHOLLS

***Sinosauropteryx* was countershaded, which suggests that it lived in an open habitat (artist's impression).**

PALAEONTOLOGY

# Dinosaur's feathers cast in new light

*Camouflage plumage patterns hint at carnivore's habitat.*

**BY JOHN PICKRELL**

In 1996, a small, fluffy carnivore called *Sinosauropteryx* became the first dinosaur known to have had feathers. In 2010, it was one of the first dinosaurs to have its colour elucidated, when an analysis[1] suggested that it had a ginger-and-white striped tail. Now, researchers have reconstructed the colour pattern across its body. Their findings reveal that *Sinosauropteryx* was countershaded — dark on top and light underneath. Its face also sported a 'bandit' mask similar to that of a raccoon.

The results, published in *Current Biology*[2] on 26 October, were based on three fossils found in China's northeastern Liaoning Province, on which impressions of feathers and traces of pigmentation had been preserved.

The team, led by Jakob Vinther, a palaeobiologist at the University of Bristol, UK, used high-resolution photography to reveal details of *Sinosauropteryx*'s feathering and coloration. The researchers then created 3D models of the abdomen and photographed them under different lighting conditions. Shadows formed on the models in direct light more closely matched the dinosaur's plumage patterns than those that formed under diffuse light, as found in a forest.

In living species, countershading masks body shape to make animals less conspicuous to predators — but the pattern depends on the environment. By looking at living animals whose dark–light transition occurs high on their flanks, the team determined that *Sinosauropteryx* probably lived in open habitat. This pattern better cancels out the 'self-shadowing' on the body that occurs in open areas.

Researchers were also curious about the purpose of the 124-million-year-old dinosaur's bandit mask. In living species, multiple functions for these masks have been proposed, such as reducing glare — something that might have been useful to *Sinosauropteryx*, whose fossils were deposited in lakeside environments.

Palaeontologist Xing Lida of the China University of Geosciences in Beijing says that advanced microscopy and photography techniques and 3D-imaging technologies are revolutionizing palaeontology. This study and others are helping scientists to develop a more complete picture of the ecosystems of northeastern China in the early Cretaceous period, around 133 million to 120 million years ago, Xing adds.

Michael Pittman, a vertebrate palaeontologist at the University of Hong Kong, says that the team's countershading hypothesis is intriguing. "But it will be nice to see if it holds up with more specimens of *Sinosauropteryx* and across other theropods," he says.

Vinther has also been involved in research suggesting similar countershading in other species of dinosaur, including a small herbivore called *Psittacosaurus* and a 1.3-tonne armoured ankylosaur called *Borealopelta*. ■


1. Zhang, F. *et al. Nature* **463,** 1075–1078 (2010).
2. Smithwick, F. M., Nicholls, R., Cuthill, I. C. & Vinther, J. *Curr. Biol.* http://dx.doi.org/10.1016/j.cub.2017.09.032 (2017).




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